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Title: Off-Site Source Recovery Program (OSRP) Overview

Author(s): Cole, James Ray

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Off-Site Source Recovery Program (OSRP) Overview

James Cole

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Overview

- Introduction
- OSRP mission
- Sources accepted by OSRP
- What do we do?

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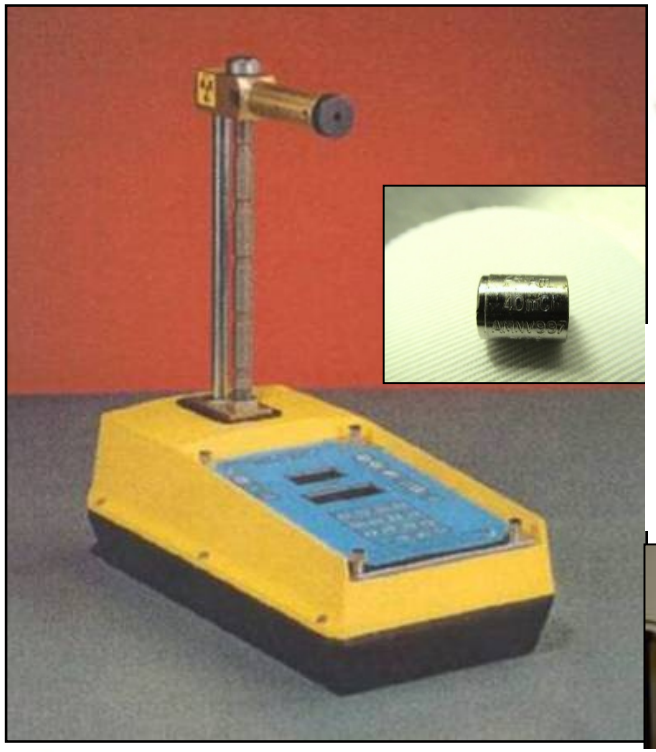
Source Categorization

Increasing Risk

Category	Practice
1	RTGs; Irradiators; Teletherapy; Gamma Knife
2	Gamma radiography Brachytherapy (high and medium dose)
3	Fixed industrial gauges; calibration sources (e.g., level, dredger, conveyor gauges) Well logging
4	Brachytherapy (low dose except eye plaques and perm implants) Portable gauges; Static eliminators; Bone densitometers
5	Brachytherapy (eye pl. and perm implants); XRF; ECD

Examples of Sources



Radiological Accident in Goiania, Brazil 1987

Abandoned ^{137}Cs teletherapy source stolen and opened; four people died, contaminated buildings demolished. *Costs to government exceeded US $20 million (over $44 million in 2018 dollars).*

Consequences of Unsecured Radioactive Sources – Republic of Georgia

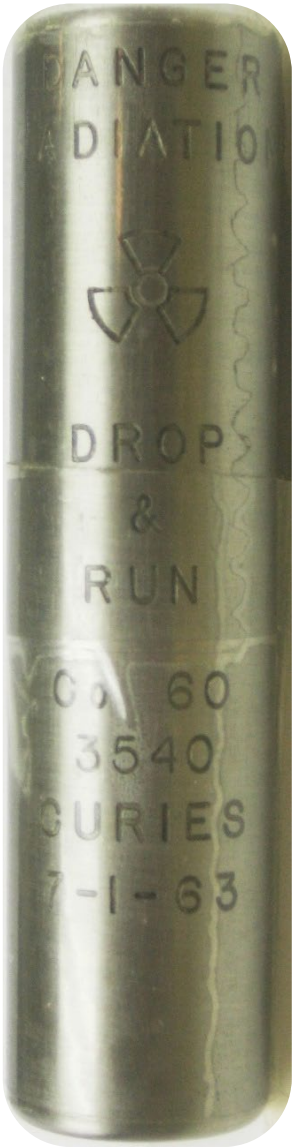
- Two woodcutters found two warm “objects” in the forest
  - Used sources for heat
  - Acute radiation syndrome in 3 hours
- Woodcutters required hospitalization
  - Both treated for burns and radiation syndrome
  - One fatality

Consequences of Unsecured Radioactive Sources (cont.)

…Serious burns developed which became life threatening for two of the woodcutters

OSRP Mission

- Eliminate excess, unwanted, abandoned, or orphan radioactive sealed sources that pose a potential risk to health, safety, and national security.



About OSRP

- OSRP was started in 1999 at Los Alamos as part of Department of Energy's (DOE) Office of Waste Management
- OSRP is now part of the National Nuclear Security Administration (NNSA) Office of Global Material Security and is managed at Los Alamos.

Sources Accepted by OSRP

- Licensees are encouraged to register excess and unwanted sealed sources with OSRP for recovery consideration.
- OSRP recoveries are generally prioritized on the basis of activity and level of security.
- If OSRP cannot recover the sources directly, staff can often identify other options that may be helpful to remove sources for secure storage or disposal.

^{238}Pu	^{90}Sr
^{239}Pu	^{137}Cs
^{241}Am	^{60}Co
^{252}Cf	^{192}Ir
^{244}Cm	^{226}Ra

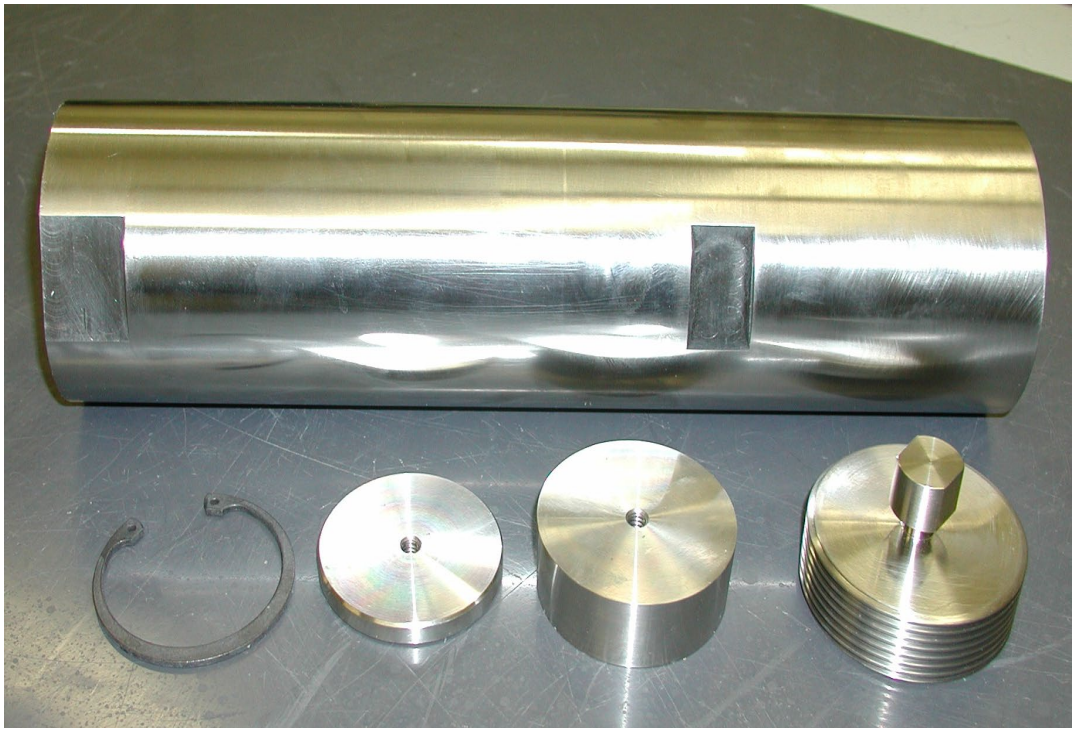
Sealed sources that are not commercially disposable are included in the OSRP mission

What Does OSRP Do?

- Package sealed sources in accordance with DOT and Nuclear Regulatory Commission (NRC) regulations
- Package material according to Waste Isolation Pilot Plant (WIPP) waste acceptance criteria
- Develop Type A and Type B containers
- Conducting trainings on special form encapsulation and proper source handling
- Provide consultancies for International Atomic Energy Agency (IAEA) member states
- Participate in DOE's Search and Secure Program

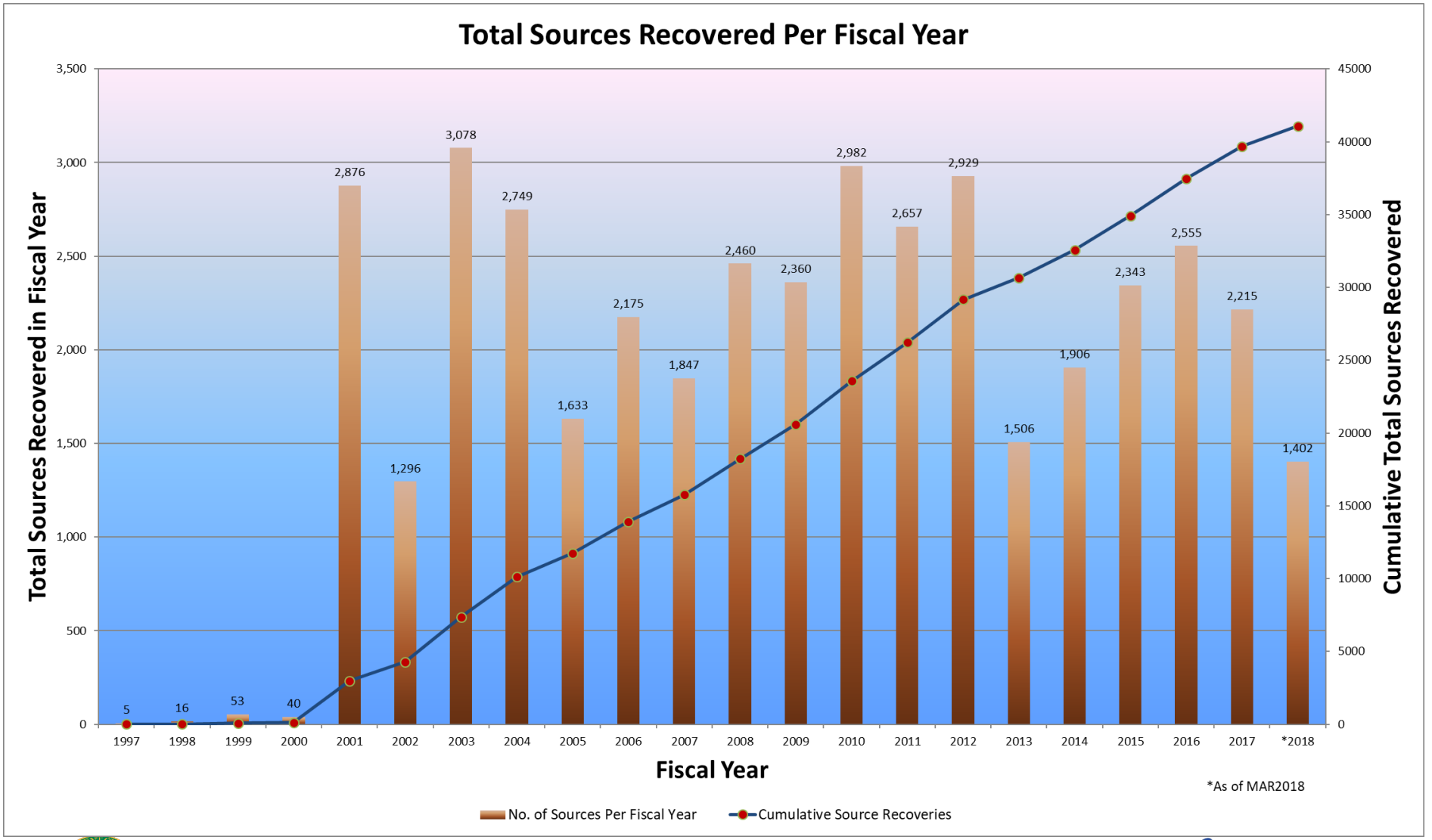
What Does OSRP Do?

- Perform special form encapsulation for sealed sources to simplify transportation



OSRP Recovery Summary

- OSRP has recovered over 42,000 sources—nearly 46,250 TBq (1.25 million Ci)—as of October 2018.



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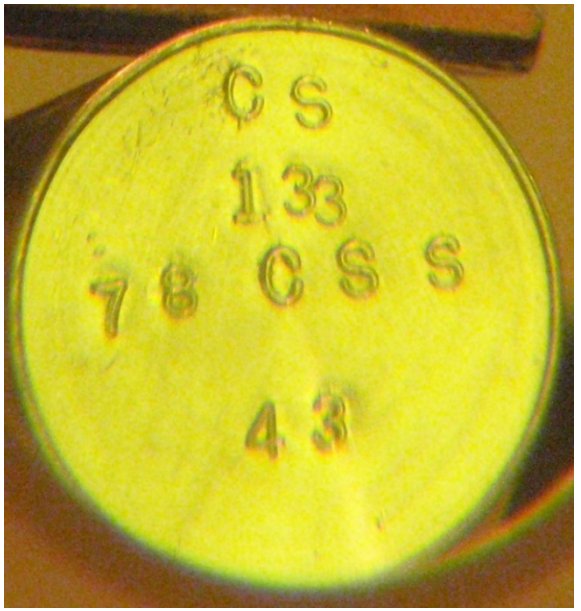
High Activity Beta/Gamma Overview

Background

- Started by recovering Gammators across the US in schools and hospitals (1996-2001) with help from CRCPD (24 units)
- 2004-2007 added additional models of irradiator devices approved for removal
- 2014 NNSA launched Cesium Irradiator Replacement Project (CIRP)
- Recovered sources to date
  - 9,173 sources
  - 815,618 Ci



Examples of Devices

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GammaCell 1000

GammaCell 3000

IBL 437C

GammaCell 40

Transportation

- Most, if not all devices require Type B Containers for removal.
  - Limited amount of containers eligible for source transport
  - Certain Type B Containers can only move certain devices
  - Activity of some devices outside of transportation allowances
  - Lack of licensed vendors with ability to work on various devices
  - High cost

NSSA 10-160B

- OSRP possession of an unused CNS 10-160B in April 2012
  - Vendors provide qualified, licensed work on the devices
  - Shipment is handled by INL
  - OSRP provides a contract vehicle
- Utilize 10-160B for recoveries and disposals

Container Development

- OSRP began work on two Type B Containers in 2009
  - The 435-B is a smaller, Non-shielded over-pack container
  - The 380B is a larger, shielded over-pack container

435 B Drop Test

435 B Puncture Test

First Recovery Using 435 B

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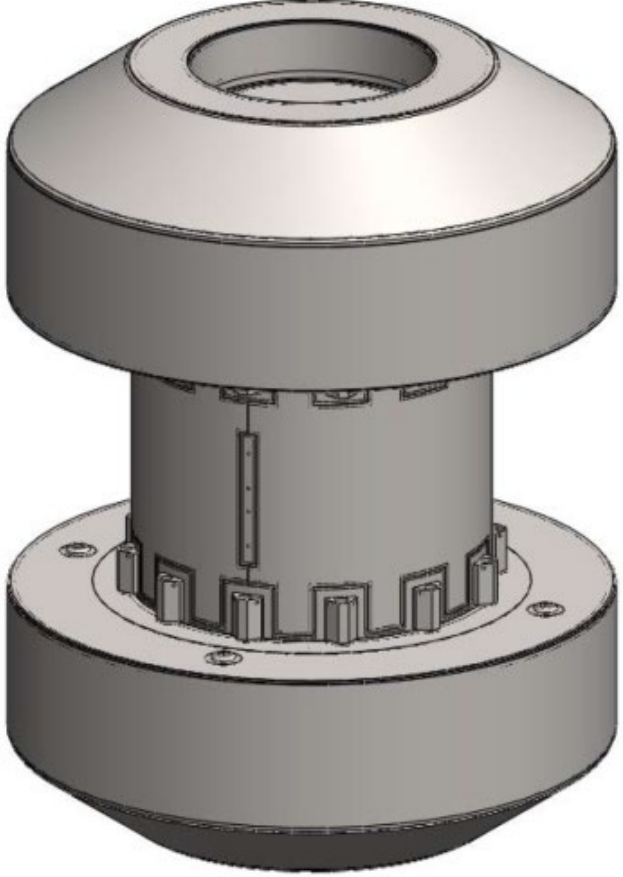
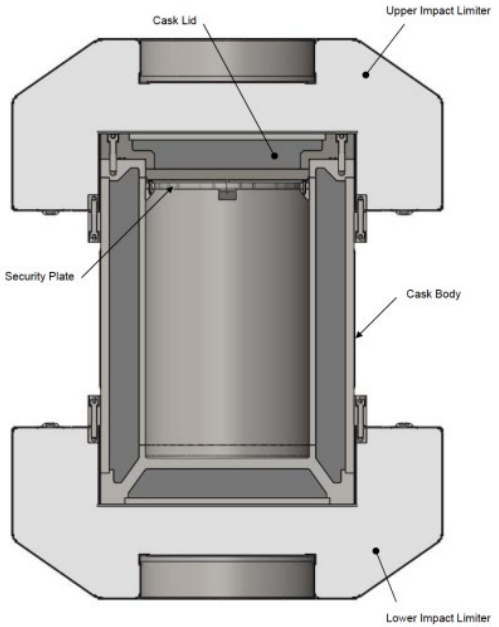
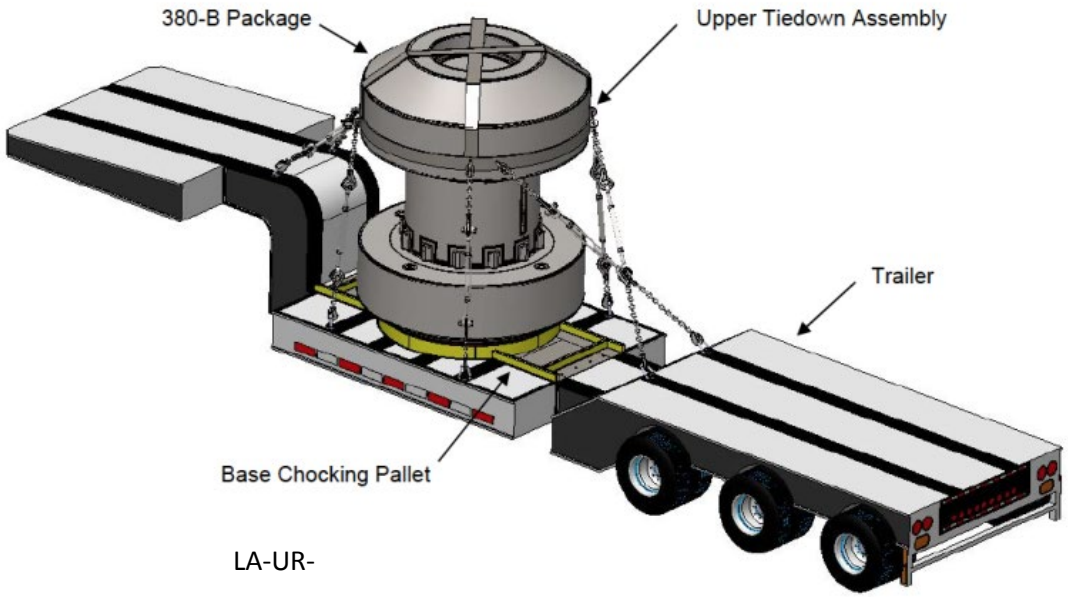
380-B Design







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International Activities

- OSRP staff cooperate with IAEA, member states, and other international organizations for repatriation of radioactive sources to the country of origin.
- OSRP staff participate in consultancies or provide training for IAEA source recovery efforts.
- OSRP has recovered sources internationally
- Search and Secure Project

IAEA
International Atomic Energy Agency

Questions?